

Higher blood pressure may be linked to brain disease, Alzheimer's

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Older people who have higher blood pressure may have more signs of brain disease, specifically brain lesions, according to a study published in the July 11, 2018, online issue of *Neurology*, the medical journal of the

American Academy of Neurology. Researchers also found a link between higher blood pressure and more markers of Alzheimer's disease, tangles in the brain.

"Blood [pressure](#) changes with aging and disease, so we wanted to see what kind of impact it may have on the [brain](#)," said study author Zoe Arvanitakis, MD, MS, of the Rush Alzheimer's Disease Center at Rush University Medical Center in Chicago, and a Fellow of the American Academy of Neurology. "We researched whether [blood pressure](#) in later life was associated with signs of brain aging that include plaques and tangles linked to Alzheimer's disease, and brain [lesions](#) called infarcts, areas of dead tissue caused by a blockage of the blood supply, which can increase with age, often go undetected and can lead to stroke."

Healthy blood pressure is less than 120/80 millimeters of mercury (mmHg). High blood pressure is above 140/90 mmHg. The higher number is called [systolic blood pressure](#), the pressure in the blood vessels when the heart beats. The lower number is called diastolic blood pressure, the pressure when the heart is at rest.

For the study, 1,288 older people were followed until they died, which was an average of eight years later. The average age at death was 89 years. Blood pressure was documented yearly for each participant and autopsies were conducted on their brains after death. The average systolic blood pressure for those enrolled in the study was 134 mmHg and the average diastolic blood pressure was 71 mmHg. Two-thirds of the participants had a history of [high blood pressure](#), and 87 percent were taking high blood pressure medication. A total of 48 percent of the participants had one or more brain infarct lesions.

Researchers found that the risk of brain lesions was higher in people with higher average systolic blood pressure across the years. For a person with one standard deviation above the average systolic blood pressure,

for example 147 mmHg versus 134 mmHg, there was a 46 percent increased risk of having one or more brain lesions, specifically infarcts. For comparison, the effect of an increase by one standard deviation on the risk of having one or more brain infarcts was the equivalent of nine years of brain aging.

Those with one standard deviation above the average systolic blood pressure also had a 46 percent greater chance of having large lesions and a 36 percent greater risk of very small lesions. Arvanitakis noted that an important additional result of the study was that people with a declining systolic blood pressure also had an increased risk of one or more brain lesions, so it was not just the level but also the declining blood pressure that was associated with brain lesions.

Separately, higher average diastolic blood pressure was also related to brain infarct lesions. People who had an increase of one [standard deviation](#) from an average [diastolic blood pressure](#), for example from 71 mmHg to 79 mmHg, had a 28 percent greater risk of one or more brain lesions.

The results did not change when researchers controlled for other factors that could affect the risk of [brain lesions](#), such as whether they used high blood pressure drugs.

When looking for signs of Alzheimer's disease in the brain at autopsy, researchers found a link between higher average late-life systolic blood pressure across the years before death and a higher number of tangles, but not plaques. Arvanitakis said this link is difficult to interpret and will need more research.

"While our findings may eventually have important public health implications for blood pressure recommendations for [older people](#), further studies will be needed to confirm and expand on our findings

before any such recommendations can be made," said Arvanitakis.

Limitations of the study include that researchers did not have access to blood pressure of participants in middle age, only in later life, and that [blood](#) pressure information was recorded only once a year and not more frequently.

Provided by American Academy of Neurology

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